CYANIDE AND THE ENVIRONMENT

What is cyanide?

Cyanide is a highly toxic element that is found both naturally and as an introduced contaminant in the environment. Cyanides are naturally occurring substances found in a number of foods and plants and produced by certain bacteria, fungi, and algae. Cyanide is present in a number of compounds such as hydrogen cyanide, sodium cyanide, and potassium cyanide. In Zimbabwe, sodium cyanide is commonly used by artisanal/small scale miners in gold processing.

Main sources of cyanide contamination

Cyanide is used in a number of industries and is found at low levels in air from car exhausts. The major uses of cyanide are as an intermediate in the production of a number of chemicals and as an insecticide for fumigating enclosed spaces. Hydrogen cyanide has been used in gas chamber executions. Two most important uses of other cyanide compounds are in electroplating and metal treatment, including gold processing.

Effects of cyanide:

On the Environment

Cyanide and other dangerous chemicals, such as mercury, are commonly used in artisanal gold mining. Since gold mines are almost always set up near rivers, often excess chemicals are distributed directly into waterways, thus polluting water sources. Once it becomes imbedded in soil or water, cyanide is extremely toxic to humans.

Artisanal gold mining also presents several environmental challenges due to the inherent digging of soil and rinsing involved in artisanal mining. Siltation, erosion, and soil degradation can be issues in rivers used for mining. Rivers are also commonly diverted as a way to access mineral rich riverbeds. The digging of mines can also spread harmful materials, such as lead, that are located within the soil. The conservation of forests is also a great concern as many artisanal mining operations take place in and around forests that are home to vast amounts of biodiversity, artisanal mining operations often cut down trees to clear space for their camps.

On human beings

Cyanide is extremely toxic to humans; long-term inhalation of cyanide affects the central nervous system. Short-term inhalation exposure to 100 milligrams per cubic meter (mg/m^3) or more of hydrogen cyanide causes death in humans. Severe exposure to lower concentrations (6 to 49 mg/m^3) of hydrogen cyanide causes a variety of effects in humans, such as weakness, headache, nausea, increased rate of respiration, and eye and skin irritation. Continuous exposure to cyanide in humans via inhalation results in effects such as headaches, dizziness, numbness, tremor, and loss of visual sharpness. Other effects include cardiovascular and respiratory effects, an enlarged thyroid gland, and irritation to the eyes and skin.

On animals.

Animal studies have reported effects on the nervous, cardiovascular, and respiratory systems. In high concentrations, cyanide is toxic to aquatic life, especially fish which are one thousand times more sensitive to cyanide than humans. Zimbabwe recorded the worst ecological disaster last year which resulted in the death of over 100 elephants at Hwange National Park due to cyanide poisoning. Animal studies have suggested that oral exposure to cassava (a cyanide-containing vegetable) may be associated with malformations in the fetus and low fetal body weights.

Legal framework for the use of cyanide

Many countries, including Zimbabwe recommend that mines that use cyanide do so in a manner consistent with the International Cyanide Management Code, which involves minimizing the amount of cyanide used; designing measures to protect surface and groundwater; designing and operating systems that reduce cyanide levels in effluent; and preventing spills. The Environmental Management Act Cap (20:27) as read with Statutory Instrument 12 of 2007, Hazardous Substances, Pesticides and Toxic Substances Regulations state that, any person who imports, transports, stores or sells any hazardous substance must have a license for each purpose. Cyanide is a hazardous substance, and legislation requires it to be transported, handled, and disposed of by fully trained personnel in certified storage containers. Its disposal and discharge into the environment at mine sites is regulated through the use of permits and licences. In addition, the cyanide concentration of effluent leaving a metal mining

operation must be less than 0,07 mg/L as prescribed in Statutory Instrument 6 of 2007 (Solid Waste and Effluent Regulations).

What should happen in case of a cyanide spillage?

*ANY ACCIDENTAL SPILLAGE MUST BE REPORTED TO **EMA** BOTH VERBALLY AND IN WRITING WITHIN **8 HOURS**. THE AGENCY SENDS A REACTION TEAM TO NUETRALISE THE TOXIC SUBSTANCES FOLLOWING WHICH AN INVESTIGATION WILL BE CONDUCTED. THE CLEANING UP THE OF SPILL IS DONE BY THE COMPANY RESPONSIBLE FOR THE SPILLAGE. THE AREA MUST BE CLEANED UP TO RETAIN ITS USABLE STATE.*

What is Zimbabwe doing about cyanide?

The Environmental Management Agency is working on legislation (Statutory Instrument for the Control of Alluvial Mining Regulations) to prohibit the use of dangerous chemicals such as mercury and cyanide by alluvial gold miners and alluvial gold mining activities "*on land within 200 metres of naturally defined banks or land within 200 metres of the highest flood level of any body of water…stream, or any bed, banks or course of any river or stream, or land within 200m of any wetland."* There is need for the sector to adopt sustainable technologies to extract gold for the protection of the environment. Zimbabwe is signatory to the Minamata Convention of 2013, an international treaty designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The Convention was a result of international action aimed at managing mercury in an efficient, effective and coherent manner, whilst member state work on towards its total elimination.

Please talk to us we are always ready to listen. Email: eep@ema.co.zw or 04 305543 / Toll free 08080028, sms/whatsapp 0779 777 094, Like our Facebook Page- Environmental Management Agency or follow us on Twitter @EMAeep.